

Safety Restriction



Network Assets

Version 1.0

Failure of Arteche CH-123 110 kV CT

Background

On 22nd July 2021, in Drumkeen 110 kV Station, an Arteche CH-123 110 kV Current Transformer (CT) ruptured. This resulted in porcelain shattering and subsequent damage to other equipment in the station. There were no staff in the station at the time of the failure. Replacement of the remaining Arteche CH-123 CT's in Drumkeen station is planned and underway. See shield incidents [84786](#) and [84691](#)

An investigation of the incident is underway, and a follow up risk assessment has been completed through collaboration between Operations, Project Delivery, E&MP and Network Assets. This safety restriction will remain in place until additional investigation & condition assessment is carried out of remaining population of CT's. Network Assets will advise of any update/revision to safety controls that shall apply, via this document.

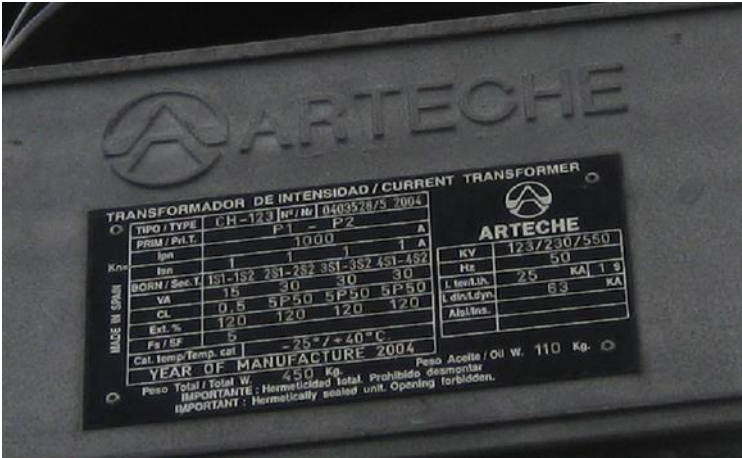



Figure 1 Arteche CH-123 110 kV Current Transformer

Figure 2 Arteche CH-123 110 kV Current Transformer Name Plate

Restriction Details

Product	Arteche CH-123 110 kV CT's
Manufacturer	Arteche
Problem	Suspected Moisture Ingress across Rubber Bellows Unit
Scope	All Arteche CH-123 110 kV CT's (recorded locations listed below)
Risk	<p>Rupture of CT which could lead to:</p> <ul style="list-style-type: none"> • Injury of staff • Damage to surrounding equipment in station • Expulsion of oil and environmental damage • There is a heightened risk of failure of these units as the internal oil cools down during evening time after hot days (> 20deg C).
Restrictions	<ol style="list-style-type: none"> 1. No further regular works and compound switching shall take place in the stations listed below unless all Arteche CH-123 CT's in the station are de-energised. 2. All station visitors shall contact NDCC & NCC <u>prior</u> to accessing the station in case of any ongoing lightning activity, switching activity or ongoing earth faults etc. as per : <ul style="list-style-type: none"> - DOC-230517-CSJ Entering and Exiting HV Substations - DOC-060919-FDR Working with the Risk of Lightning 3. Due to evening time risk outlined above in risk section, any essential switching should be limited to morning times where possible. 4. With all Arteche CH-123 CT's in the station already de-energised, any access needed to compound shall be minimised and only take place for essential tasks. 5. All essential switching operations in the below stations should be completed via control room or SCADA 6. The station compound shall be cleared during energisation/de-energisation of any Arteche CH-123 110 kV CT 7. Full PPE shall be worn as per DOC-300517-CST
Action to Remove Restriction	This safety restriction will remain in place until such time as the root cause of the incident is determined and appropriate controls are put in place as advised by Network Assets.

Immediate Actions Required

1. Supervisors/Managers of staff with approvals to enter HV and MV stations shall issue them with a copy of this restriction.
2. System Managers, Controllers, Operators, PICW's, Supervisors issuing work, NT's and all persons with approvals to hold station keys shall take note of and implement the contents of this restriction.
3. The Asset Owner shall issue type 22 MO's in ARM for the application of warning signage on all station gates and cubicles where Arteche CH-123 CT's are installed. Signage on cubicles shall only be applied if the Arteche CH-123 CT's in that cubicle are de-energised. Asset Owners shall issue Type 23 MO's in ARM for removal of the restriction.

Restriction Signage

All cubicles with Artech CH-123 CT's shall have a red restriction notice affixed (Code 8238371) to the cubicle. This notice shall be amended to include the word "Safety" in place of "Operations" and the number "DOC-040821-GXO". entrance gate to the inner compound.



Derogation

A derogation to this restriction can be applied for by submitting a risk assessment and method statement to the Manager, HV Stations, Network Assets.

Recorded Locations

Functional Location	STATION	CUBICLE
984000-H01	AGANNYGAL	DERRYBRIEN CUBICLE
984000-H02	AGANNYGAL	ENNIS 110KV CUBICLE
984000-H03	AGANNYGAL	SHANNONBRIDGE 110KV CUBICLE
796000-H03	CLONKEEN	CLASHAVOON H3 CUBICLE
796000-H02	CLONKEEN	COOMAGEARLAGHY H2 CUBICLE
796000-H01	CLONKEEN	KNOCKERAGH H1 CUBICLE
987000-H03	RATHRUSSAN	LOUTH 110kv CUBICLE
987000-H04	RATHRUSSAN	SHANKILL 110kv CUBICLE
987000-H01	RATHRUSSAN	T121 110kv CUBICLE
987000-H02	RATHRUSSAN	T122 110kv CUBICLE

Risk Assessment

Risk Before Control Measures					Risk After Control Measures						
Ref	Hazard	Risk (potential Harm)	Persons at Risk	Likelihood (L)	Severity (S)	Risk Rating = L x S	Control Measures	Responsible	Likelihood (L)	Severity (S)	Risk Rating = L x S
1	Airborne porcelain from CT Rupture	Injury to persons, damage to adjacent plant	Stations NT's, Operations NT's, On-call NT's, Approved station keyholders, IPP Staff, ESBT	3	5	15	Brief Eirgrid on system risk & request full station (one day) outages from Eirgrid to facilitate Oil Sampling. Confirm with Eirgrid requirement for Remote Switchout Only Complete Oil Sampling of all remaining units. EMP to issue RAAG model to enable decisions on replacement/further controls etc. Replace at risk units asap. Issue Notification for no other work to take place in 4 x 110kV stations above until further notice/receipt of test results. (Follow up with Safety Restriction) Any access needed to compound should be minimised and should not take place after daily temperature peak. General Ops Precautions - Control Room Operating Only. No access to compound in event of lightning/earth faults. Full PPE shall be worn. All station visitors to engage with NCC prior to accessing station to ascertain lightning activity, switching activity, earth faults etc. Apply Station Warning Signage with specific warning of hazard. Brief Station NT's/ESBT Safety Supervisor(s) & IPP Station contacts on latest controls	BC & Station Supervisors E&MP PD BC/LC	1	5	5
2	Hot/burning oil	Injury to persons, damage to adjacent plant	Stations NT's, Operations NT's, On-call NT's, Approved station keyholders, IPP Staff, ESBT	2	5	10	As above	Station Supervisors BC/Station Supervisors	1	5	5
3	Electricity	Fallen conductor, induced voltages	Stations NT's, Operations NT's, On-call NT's, Approved station keyholders.	2	5	10	As above		1	5	5
4	Flying porcelain from pressurised SF6 CB	Injury to persons, damage to adjacent plant	Stations NT's, Operations NT's, On-call NT's, Approved station keyholders, IPP Staff, ESBT	2	5	10	As above		1	5	5
5	Environment	Unmanaged loss of oil or SF6	Stations NT's, Operations NT's, On-call NT's, Approved station keyholders.	4	3	12	Ensure all staff briefed on Procedure for Responding to "Responding to and Reporting Accidental Loss of Transformer Oil" Carry out oil sampling & replace at risk units	Station PL's for Agannygal/Rathnassan/Clonkeen	3	2	6
6				1	1	1			1	1	1
<div><div><div><div>Factor</div><div>Likelihood</div><div>1 Almost impossible</div><div>2 Very unlikely</div><div>3 Unlikely</div><div>4 Likely</div></div><div><div>Factor</div><div>Severity</div><div>1 Minor injury</div><div>2 Lost time injury</div><div>3 Long Term Absence</div><div>4 Major Permanent Incapacity</div></div></div><div><div>Persons at risk: E = ESB Staff C = Contractor Staff P = Members of the public</div><div><div>Likelihood</div><div>12345 23456 34567 45678 56789</div><div>1-3 Tolerable 4-6 Apply Judgement 7-25 Indicate Risk</div><div><div>1-3 Tolerable</div><div>4-6 Apply Judgement</div><div>7-25 Indicate Risk</div></div></div><div><div>Risk = Likelihood x Severity</div><div>1-3 Tolerable 4-6 Apply Judgement 7-25 Indicate Risk</div><div><div>1-3 Tolerable</div><div>4-6 Apply Judgement</div><div>7-25 Indicate Risk</div></div></div></div></div>											

Factor	Likelihood
1	Almost Impossible
2	Very unlikely
3	Unlikely
4	Likely

Factor	Severity
1	Minor injury
2	Lost time injury
3	Long Term Absence
4	Major Permanent Incapacity

Persons at risk:
E = ESB Staff
C = Contractor Staff
P = Members of the public

Likelihood	Severity
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

Risk = Likelihood x Severity
1-3 Tolerable
4-6 Apply Judgment
7-10 Review Risk

Green	Yellow	Red
✓	⚠	✗

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